

CLAIMS

What is claimed is:

1. In a time division multiple access communication
5 system having a base station and a plurality of user stations, a
method of communicating between the base station and a user
station, comprising the steps of:

establishing a series of time frames, each time frame
comprising a plurality of time slots; and

10 transmitting a plurality of messages from the base
station to the user station, each of said messages comprising an
information element indicating a location of a subsequent time
slot available for communication.

15 2. The method of claim 1, wherein said plurality of
messages comprise control traffic messages, and wherein said step
of transmitting a plurality of messages from the base station to
the user station comprises the step of completing a control
traffic transaction.

20 3. The method of claim 1, further comprising the step
of completing a handshake transaction between said base station
and said user station so as to establish a communication channel,
and thereafter exchanging bearer traffic messages between said
25 user station and said base station over said established
communication channel.

30 4. The method of claim 1, wherein said step of
transmitting said plurality of messages comprises the step of
spread spectrum encoding said messages.

5. The method of claim 1, further comprising the step
of transmitting a plurality of messages from the user station to

the base station, each of said plurality of messages transmitted in the time slot indicated by the information element of the preceding message from the base station.

5 6. In a communication system comprising at least one base station capable of communicating with a plurality of user stations, a method of communication comprising the steps of:
transmitting a first message from the base station,
said first message comprising an information element indicating a
10 relative time position for a subsequent communication;
receiving said first message at a user station;
transmitting, according to said relative time position,
a second message from said user station to said base station; and
receiving said second message at said base station.

15 7. The method of claim 6 wherein said step of transmitting said first message comprises the step of spread spectrum encoding said first message, and wherein said step of transmitting said second message comprises the step of spread
20 spectrum encoding said second message.

25 8. The method of claim 6 wherein said base station and said user station communicate according to a time division multiple access protocol in which a series of time frames are each divided into a plurality of time slots, and —
wherein said information element indicates said
relative time position by reference to a designated one of said
time slots.

30 9. A message structure for use in a time division multiple access communication system, said time division multiple access communication system operating according to a

communication protocol by which a series of time frames are each divided into a plurality of time slots, said message structure comprising:

a data segment; and

5 a header segment, said header segment comprising a next slot pointer.

10 10. The message structure of claim 9 wherein said next slot pointer identifies a subsequent time slot available for communication.

15 11. The message structure of claim 10, wherein said slot pointer comprises a numerical value indicating a relative number of time slots until said subsequent time slot available for communication.

20 12. The message structure of claim 10, wherein said slot pointer comprises a numerical value indicating a position of said subsequent time slot available for communication relative to a starting point of a time frame.

25 13. In a time division multiple access communication system wherein a base station is capable of communicating with a plurality of user stations, a method of communicating comprising the steps of:

transmitting a first plurality of control traffic messages from a user station to a base station in a first plurality of time slots, at least two of said first plurality of time slots within a single time frame;

30 receiving said first plurality of control traffic messages at said base station;

transmitting a second plurality of control traffic messages from said base station to said user station in a second

plurality of time slots, at least two of said second plurality of time slots within a single time frame; and

receiving said second plurality of control traffic messages at said user station.

5

14. The method of claim 13 wherein said step of transmitting said first plurality of control traffic messages comprises the step of spread spectrum encoding said first plurality of control traffic messages, and wherein said step of transmitting said second plurality of control traffic messages comprises the step of spread spectrum encoding said second plurality of control traffic messages.

10
15
20
25
30
35
40
45
50
55
60
65
70
75
80
85
90
95
100
105
110
115
120
125
130
135
140
145
150
155
160
165
170
175
180
185
190
195
200
205
210
215
220
225
230
235
240
245
250
255
260
265
270
275
280
285
290
295
300
305
310
315
320
325
330
335
340
345
350
355
360
365
370
375
380
385
390
395
400
405
410
415
420
425
430
435
440
445
450
455
460
465
470
475
480
485
490
495
500
505
510
515
520
525
530
535
540
545
550
555
560
565
570
575
580
585
590
595
600
605
610
615
620
625
630
635
640
645
650
655
660
665
670
675
680
685
690
695
700
705
710
715
720
725
730
735
740
745
750
755
760
765
770
775
780
785
790
795
800
805
810
815
820
825
830
835
840
845
850
855
860
865
870
875
880
885
890
895
900
905
910
915
920
925
930
935
940
945
950
955
960
965
970
975
980
985
990
995

15. The method of claim 13 wherein at least one of the control traffic messages in said second plurality of control traffic messages comprises a next slot pointer.

16. The method of claim 15 wherein said next slot pointer indicates a relative position of a subsequent time slot for transmitting a control traffic message of said first plurality of control traffic messages.

17. The method of claim 13 wherein said first plurality of control traffic messages and said second plurality of control traffic messages are transmitted over the same frequency band—

18. In a time division multiple access communication system having a series of time frames each divided into a plurality of time slots, said time slots collectively comprising a plurality of user transmission intervals and a plurality of base transmission intervals, a method of communication comprising the steps of:

transmitting, over a designated frequency band and in a first base transmission interval, a general poll message from a base station;

receiving said general poll message at a user station;
5 transmitting in response to said general poll message, over said designated frequency band and in a first user transmission interval, a general response message from said user station to said base station;

receiving said general response message at said base
10 station;

transmitting in response to said general response message, over said designated frequency band and in a second base transmission interval, a specific poll message from said base station to said user station; and

receiving said specific poll message at said user
15 station;

wherein said general poll message, said general response message, and said specific poll message are all transmitted within the time span of a single time frame.

19. The method of claim 18, wherein each time slot is duplex and comprises a user transmission interval followed by a base transmission interval.

20. The method of claim 18 wherein said first user transmission interval and said second base transmission interval are located within the same time slot.

21. The method of claim 18 further comprising the
30 steps of:

transmitting, over said designated frequency band and in a second user transmission interval, a user control traffic message from said user station to said base station;

receiving said user control traffic message at said
base station;

transmitting, over said designated frequency band and
in a third base transmission interval, a base control traffic
5 message from said base station to said user station; and

receiving said base control traffic message at said
user station.

22. The method of claim 18, wherein:

10 said general poll message is transmitted in a first
time slot;

said general response message is transmitted in a
second time slot; and

15 said general poll message comprises a next slot pointer
identifying to the user station a slot position of said second
time slot.

23. The method of claim 18 wherein said specific poll
message comprises a next slot pointer identifying to the user
20 station a slot position of a subsequent time slot for
communication between the base station and the user station.

24. The method of claim 18 wherein said steps of
transmitting said general poll message, transmitting said general
25 response message, and transmitting said specific poll message
each comprise the step of transmitting a spread spectrum signal.

25. The method of claim 18 further comprising the
steps of:
30 connecting a call from a network to said base station;
completing said call from said base station to said
user station; and

thereafter exchanging bearer traffic messages between
said user station and said base station during said call.

26. A multiple-user communication system, comprising:
5 a base station, said base station generating a series
of time frames, each of said time frames comprising a plurality
of time slots; and

a plurality of user stations;

10 wherein said base station transmits control traffic
messages during selected ones of said time slots, each control
traffic message comprising a next slot pointer identifying a
subsequent time slot available for communication; and

15 wherein a user station responding to one of said
control traffic messages does so in the time slot identified by
the next slot pointer of that control traffic message.

20 27. The multiple-user communication system of claim
26, wherein each of said time slots comprises a first interval
during which a user message may be transmitted by a user station
to which the time slot is assigned, and a second interval during
which the base station may transmit a base message.

25 28. The multiple-user communication system of claim 27
wherein said user message and said base message are each
transmitted in a spread spectrum format.

30 29. The multiple-user communication system of claim 27
wherein said base message comprises a base header segment, and
wherein said next slot pointer is contained within said base
header segment.

30. In a time division multiple access communication system in which a time frame is divided into a plurality of time slots, a method of communication comprising the steps of:

5 communicating between a mobile station and a first base station; and

handing off communication from said first base station to a second base station, said step of handing off communication comprising the step of exchanging a plurality of control traffic messages between said mobile station and said second base station
10 during multiple time slots of a single time frame.

31. The method of claim 30, further comprising the step of establishing a duplex communication link between said mobile station and said second base station as a result of said
15 step of exchanging said plurality of control traffic messages.

32. The method of claim 31, further comprising the step of assigning a time slot for bearer communication to said mobile station as a result of said step of exchanging said
20 plurality of control traffic messages.

33. The method of claim 32, further comprising the step of exchanging bearer traffic messages between said mobile station and said second base station during said time slot
25 assigned for bearer communication.

34. The method of claim 30, wherein said step of exchanging a plurality of control traffic messages between said mobile station and said second base station during multiple time
30 slots of a single time frame comprises the step of transmitting a next slot pointer in each control traffic message transmitted from said second base station to said mobile station.